How to Buy an Energy-Efficient Residential Freezer

Energy Efficiency and Renewable Energy
Federal Energy Management Program

Why Agencies Should Buy Efficient Products

- *Executive Order 13123 and FAR part 23.704 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE* ENERGY STAR® *product labeling program.*
- *Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.*
- *As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy efficiency, while saving taxpayer dollars.*

Federal Supply Source:

- General Services Administration (GSA)
  Phone: (816) 926-6760
  www.fss.gsa.gov
  www.gsaadvantage.gov
- Defense Logistics Agency (DLA)
  Phone: (800) DLA-2852 or (215) 737-7950
  www.dla.mil
  www.emall.dla.mil

For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
  Phone: (800) 363-3732
  www.eere.energy.gov/femp/procurement
- ENERGY STAR has an online list of products that meet this recommendation.
  Phone: (800) 363-3732
  www.energystar.gov
- American Council for an Energy-Efficient Economy (ACEEE) publishes the *Consumer Guide to Home Energy Savings* which has a chapter on food storage.
  Phone: (202) 429-0063
  www.aceee.org
- Consumers Union publishes *Consumer Reports* magazine and the *Consumer Reports Annual Buying Guide*.
  Phone: (800) 500-9760
  www.consumerreports.org
- *Home Energy* magazine provides energy conservation tips for residential appliances.
  Phone: (510) 524-5405
  www.homeenergy.org
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
  Phone: (202) 646-7950

Efficiency Recommendation

Freezer Type - Defrost	Total Volume	Annual Energy Consumption[a]	
		Recommended	Best Available[b]
Chest - Manual	≤ 4.4 cu. ft.	200 kWh or less	--
Chest - Manual	4.5 - 6.4 cu. ft.	230 kWh or less	--
Chest - Manual	6.5 - 8.4 cu. ft.	260 kWh or less	--
Chest - Manual	8.5 - 10.4 cu. ft.	290 kWh or less	251 kWh
Chest - Manual	10.5 - 12.4 cu. ft.	320 kWh or less	298 kWh
Chest - Manual	12.5 - 14.4 cu. ft.	350 kWh or less	--
Chest - Manual	14.5 - 16.4 cu. ft.	380 kWh or less	354 kWh
Chest - Manual	16.5 - 18.4 cu. ft.	410 kWh or less	360 kWh
Chest - Manual	18.5 - 20.4 cu. ft.	440 kWh or less	415 kWh
Chest - Manual	≥ 20.5 cu. ft.	470 kWh or less	460 kWh
Upright - Manual	≤ 6.4 cu. ft.	305 kWh or less	--
Upright - Manual	6.5 - 8.4 cu. ft.	330 kWh or less	292 kWh
Upright - Manual	8.5 - 10.4 cu. ft.	355 kWh or less	353 kWh
Upright - Manual	10.5 - 12.4 cu. ft.	380 kWh or less	--
Upright - Manual	12.5 - 14.4 cu. ft.	405 kWh or less	--
Upright - Manual	14.5 - 16.4 cu. ft.	430 kWh or less	409 kWh
Upright - Manual	16.5 - 18.4 cu. ft.	455 kWh or less	430 kWh
Upright - Manual	18.5 - 20.4 cu. ft.	480 kWh or less	--
Upright - Manual	≥ 20.5 cu. ft.	505 kWh or less	--
Upright - Automatic	≤ 12.4 cu. ft.	530 kWh or less	-
Upright - Automatic	12.5 - 14.4 cu. ft.	565 kWh or less	442 kWh
Upright - Automatic	14.5 - 16.4 cu. ft.	600 kWh or less	582 kWh
Upright - Automatic	16.5 - 18.4 cu. ft.	635 kWh or less	482 kWh
Upright - Automatic	18.5 - 20.4 cu. ft.	670 kWh or less	670 kWh
Upright - Automatic	≥ 20.5 cu. ft.	705 kWh or less	--

a) Annual Energy Consumption is based on DOE test procedure.

b) "-- indicates that data are not available on models exceeding the current national efficiency standard.

Where to Find Energy-Efficient Freezers

Energy-efficient residential freezers are available through both federal supply sources. The General Services Administration offers freezers through its Multiple Awards Schedules and on-line shopping network, *GSA Advantage!* The Defense Logistics Agency sells them through the Defense Supply Center in Philadelphia and online through *DoD EMall*. Look for products that qualify for the EPA/DOE ENERGY STAR® label (see "For More Information"), all of which meet the recommended levels. For products that don't display the ENERGY STAR, look at the yellow EnergyGuide label to identify models with an estimated annual energy use that meets these Efficiency Recommendations. For a contractor-supplied freezer, specify an estimated annual energy use that meets the recommended efficiency level for the freezer type and size.

Size and Type Selection

Select a freezer size and type that is appropriate for the amount of food or materials stored. Choosing an oversized freezer will increase purchase cost, require more space and also waste energy due to excess capacity. Chest freezers are more efficient than upright models because they typically have more insulation and cold air does not sink out of them when they are opened. Freezers with automatic defrost use more energy than manual defrost products and can also dehydrate food and cause "freezer burn."

Early Replacement

Due to the effective development and implementation of federal energy standards for appliances, freezers made today are substantially more efficient then those made 10 to 15 years ago. For example, a 16 cubic foot upright freezer with automatic defrost made in 1990 would use at least 1,085 kWh and cost $65 per year to operate. The same freezer made today and meeting current recommendations would use 615 kWh and cost $37 per year to operate. Early replacement would result in an annual savings of 470 kWh and $28.

Freezer Cost-Effectiveness Example (16.7 cubic foot upright with automatic defrost)

Performance	Base Model[a]	Recommended Level	Best Available
Annual Energy Use	682 kWh	615 kWh	482 kWh
Annual Energy Cost	$41	$37	$29
Lifetime Energy Cost	$562	$507	$397
Lifetime Energy Cost Savings	–	**$55**	**$165**

a) Annual energy use of the base model is meets current national appliance standards, see 10 CFR 430, Sub-Part B, Appendix A1.

Definition

Lifetime Energy Cost is the sum of the discounted value of annual energy costs based on average usage and an assumed refrigerator life of 19 years. Future electricity price trends and a discount rate of 3.0% are based on federal guidelines (effective from April, 2004 to March, 2005).

Cost-Effectiveness Assumptions

Annual energy use in this example is based on the standard DOE test procedure. The assumed electricity price is 6¢/kWh, the federal average electricity price (including demand charges) in the U.S.

Using the Cost-Effectiveness Table

In the example above the recommended freezer is cost effective if its purchase price is no more than $55 above the price of the Base Model. The Best Available model is cost-effective if its price is no more than $165 above the price of the Base Model.

Metric Conversion

1 cubic foot = 28.3 liters

What if my Electricity Price is different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings in the above table by this ratio: $\left(\frac{Your\ price\ in\ ¢/kWh}{6.0\ ¢/kWh}\right)$.